PATENT
3511-1033

IN THE U.S. PATENT AND TRADEMARK OFFICE

In re application of

Liro HIETANEN et al. Conf. 6321

Application No. 10/533,645 Group 2877

Filed: January 13, 2006 Examiner Rebecca Slomski

Title: SYNCHRONOUS OPTICAL MEASUREMENT AND INSPECTION METHOD AND MEANS

DECLARATION

Assistant Commissioner for Patents
P.O. Box 1450
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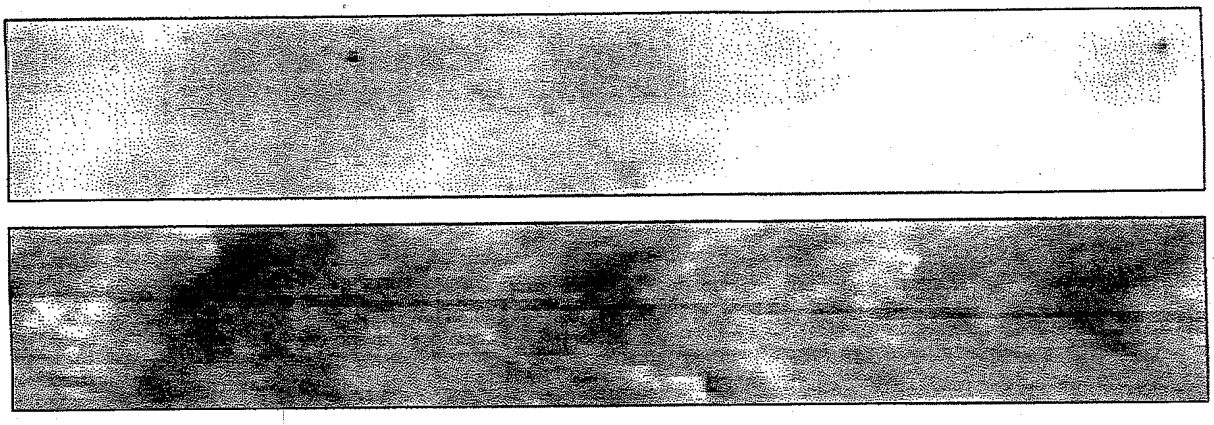
Sir:

1. I, Seppo Pyörret, a named inventor, am a citizen of Finland and reside at Mannisenkuja 5, FIN-90820, Finland.

2. I am familiar with the above-identified U.S. patent application, its prosecution before the United States Patent and Trademark Office, and the applied references of KREUZER et al. (U.S. Patent 4,937,449), PREIKSCHAT et al. (U.S. Patent 4,871,251) and KOBAYASHI et al. (U.S. Patent 5,245,671).

3. In order to demonstrate the patentability of the present invention and the non-combinability of the applied art references, I am submitting the following observations.

Below, a case is illustrated in which the same material has been photographed at two different angles of lighting. The upper picture depicts a so-called diffusion lighting angle (F1), and the lower picture depicts a mirror reflection angle (F2). The F1 frequency has been 30 kHz at stage 0° during the measurement, and the F2 frequency is 30 kHz at stage +90°.



The lower picture clearly shows a transverse rising line through the entire sample, the upper picture does not show it at all. The difference in the lighting angles is clear - it is impossible to detect the line in the upper picture. The lower picture shows all the changes in the luster of the coated paper and therefore the line also, the width of which is ca. 0.5 mm.

Combination of KREUZER et al. and PREIKSCHAT et al.

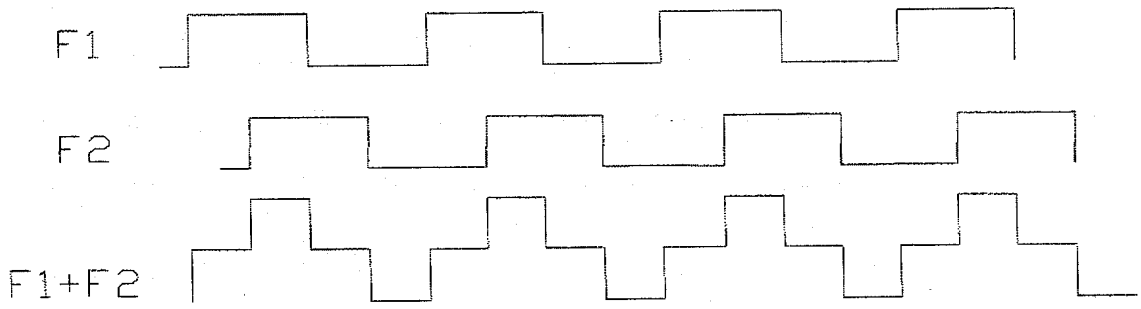
A logical combination of these two patents would lead to a device in which two or more modulation frequencies are used, and in which the PREIKSCHAT et al. method of generating a

synchronic signal for demodulating each frequency component would be used. This calls for using a band all-pass filter in front of each frequency channel.

PREIKSCHAT et al. does not work if the signal from the pre-amplifier is weak, near noise for example. In such a case, a synchronizing signal cannot be formed into rectification. This may occur, for example, in a fluoroscopic situation where the light permeation of the material is weak (cardboard) or the material is completely impermeable to light (metal). In the case of SRI, this problem never occurs because the synchronizing signal is always brought from outside and the rectification is always done according to the received synchronizing signal. In fact, this external synchronization can be used to measure a signal, which is completely covered by noise (cf. the pre-amplifier output signal), presuming that there is more signal than noise on the modulation frequency. This is impossible with both PREIKSCHAT et al. and KREUZER et al.

The KREUZER-PREIKSCHAT combination leads to the problem of how the receiver can distinguish frequency components from the pre-amplifier signal using the F1 and F2 frequency components as presented above. The picture below illustrates independent modulation frequencies F1 and F2. The lowermost

picture illustrates the signal seen after the pre-amplifier when the frequency components have been summed.



PREIKSCHAT et al. suggest that a PLL circuit be used for gathering phase information in order to perform rectification of the signals. The example above indicates that this is not possible using the PREIKSCHAT et al. method - the question is onto which frequency component (or to be exact, in which stage) PLL is locked when the sum signal F1 + F2 is examined? How can PLL distinguish these two frequency components from each other? Solving the problem clearly becomes more complex if, for example, an F3 frequency of 60 kHz is added. This problem cannot be solved using the PREIKSCHAT et al. structure.

4. I declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false

statements and the like so made are punishable by fine or imprisonment, or both, under §1001 of Title 18 of the United States code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Date April 14, 2009

Seppo Pyörret